

THE OPEN UNIVERSITY OF SRI LANKA
DIPLOMA IN TECHNOLOGY (CIVIL) - LEVEL 4
FINAL EXAMINATION - 2012/13



CEX4232 - CONSTRUCTION ENGINEERING AND PLANNING

Time allowed : Three hours

Date : Wednesday, 31st July 2013

Time : 09:30 - 12:30

Selecting at least two (2) questions from each section, answer a total of five (5) questions. All questions carry equal marks.

Answers for sections A & B should be submitted on separate answer books with Section A and Section B written clearly on the cover of the respective book.

Write down your Index Number clearly on both answer books.

SECTION A

(01)

- (a) Sketch the timber shuttering for a column and briefly describe how it is installed. (05 marks)
- (b) Describe the method of operation of a scraper using sketches where necessary. (05 marks)
- (c) Traps play an important part in internal plumbing. Explain the different types of traps used in internal plumbing with the help of neat sketches indicating the 'seal depth' in each case. (05 marks)
- (d) What are the three (3) different ways in which the water is lost from traps? Sketch how the siphonage occurs and state the causes for it. (05 marks)

(02)

- (a) Explain the terms 'entrapped air' in concrete and 'entrained air' in a concrete mix. (04 marks)
- (b) Describe the procedure to repair a honeycombed area on the side of a concrete beam. (04 marks)
- (c) Explain the non-destructive method used in laboratories, to locate the voids in a concrete member. (04 marks)
- (d) Describe what is meant by 'curing' of concrete cast at site and the reasons why it should be done. (04 marks)
- (e) Describe what is meant by 'durability of concrete' and the precautions to be taken at site to ensure the durability of a concrete structure. (04 marks)

(03)

Write short notes on the following:

- (a). Difference between 'open timbering' and 'close timbering' when used to support the ground in the process of excavation. (05 marks)
- (b). Difference between 'gantry cranes' and 'tower cranes'. (05 marks)
- (c). Difference between 'centrifugal pumps' and 'reciprocating pumps'. (05 marks)
- (d). Difference between 'rigid' and 'flexible' highway pavements. (05 marks)

(04)

- (a) Draw a diagram showing a typical wiring and switching system with two switches & two lamps. Indicate live and neutral wires clearly in the diagram. (04 marks)
- (b) There are three (3) types of electric wiring installation used in domestic buildings. Name the three types and briefly explain what they are. (04 marks)
- (c) Lamps used for lighting of domestic buildings can be either (i) filament type, or (ii) fluorescent type. Briefly explain the two types. (04 marks)
- (d) List the five (5) types of lamps commonly available. Briefly describe each of them. (04 marks)
- (e) Explain the difference between 'single-phase' and 'three-phase' power supply systems in domestic buildings. (04 marks)

SECTION B

(05)

- (a) Explain the differences between the Macro planning process and the Micro planning process of construction projects. Outline a set of macro and micro planning activities for the construction of a study hall for students of the Open University. You may make suitable assumptions. (08 marks)
- (b) Explain why construction site layout planning is an important activity and describe the procedure for site layout planning for a road construction site. (08 marks)
- (c) List and explain the ways in which wastage of materials can occur on construction sites giving examples. (04 marks)

(06)

(a)

A project consists of activities as set out below.

Activity	Name	Duration	Preceding activities
1-2	A	8	-
2-3	B	12	1-2
2-4	C	18	1-2
2-5	D	4	1-2
3-5	E	6	2-3
3-7	F	16	2-3
4-6	G	20	2-4
5-7	H	4	2-5, 3-5
6-7	I	8	4-6
7-8	J	6	3-7, 5-7, 6-7

- (i) Draw a complete activity-on-arrow network diagram for the given project. Carryout the forward pass and backward pass and determine the early event time (EET) and the late event time (LET), for each activity. (06 marks)
 - (ii) Determine the project completion time and identify the critical path (02 marks)
 - (iii) Draw Bar Charts for the activities based on early start times and late start times. (04 marks)
 - (iv) Calculate the float times for activity E (04 marks)
- (b) State the advantages of planning by network techniques in comparison to planning by bar charts. (04 marks)

(07)

- (a) Explain 'Unit Rate Estimating' and 'Operational Estimating' stating the differences. Use placing of reinforced concrete as an example to illustrate your answer. (10 marks)
- (b) Explain the items that need to be recorded when performing 'progress control' on a construction site. (05 marks)
- (c) Give an example of a accident that may occur on a construction site and explain what measures could have been taken to prevent such an accident from occurring. (05 marks)

(08)

(a) Describe the operation of a dragline by means of a sketch, stating the factors which may affect its output.

(05 marks)

(b) Briefly explain five types of concrete distribution plants.

(05 marks)

(c) Explain the terms 'operating efficiency' and 'operating factor' for a given equipment.

(05 marks)

(d) Explain the terms 'Fixed time' and 'Variable time' in relation to the Cycle time for a scraper.

(05 marks)